

## **CLAIMS**

**What is claimed is:**

- 1                   1.     A method of detecting a predisposition to cancer in an animal, said
- 2     method comprising:
  - 3                   (i) providing a biological sample from said animal;
  - 4                   (ii) detecting the level of a gene of Figure 1 or Figure 2 within said
  - 5     biological sample; and
    - 6                   (iii) comparing said level of said gene with a level of said gene in a
    - 7     control sample taken from a normal, cancer-free tissue;
    - 8     wherein an increased level of the gene of Figure 1 or a decreased level of the gene of Figure
    - 9     2 in said biological sample compared to the level of said gene in said control sample
    - 10    indicates a predisposition to cancer in said animal.

1                   2. The method of claim 1, wherein said level of said gene is detected by  
2 determining the copy number of genes in the cells of said biological sample.

1                   3. The method of claim 2, wherein said copy number is measured using  
2 Comparative Genomic Hybridization (CGH).

1                   4. The method of claim 1, wherein said copy number is determined by  
2 hybridization to an array of nucleic acid probes.

1                       5.     The method of claim 3, wherein said Comparative Genomic  
2     Hybridization is performed on an array.

1                         6         The method of claim 1, wherein said level of said gene is detected by  
2 measuring the level of said gene mRNA in said biological sample, wherein an increased  
3 level of said gene of Figure 1 or decreased level of said gene of Figure 2 RNA in said  
4 sample compared to RNA in said control sample indicates a predisposition to cancer.

1                   7.       The method of claim 6, wherein said level of mRNA is measured in  
2       said biological sample and said control sample at the same time.

1               8.     The method of claim 6, wherein said level of mRNA is measured by  
2 hybridization to one or more probes on an array.

1               9.     The method of claim 1, wherein said level of a gene of Figure 1 or  
2 Figure 2 is detected by measuring the level of the gene product of said gene in said  
3 biological sample, wherein an increased level of said product of the gene of Figure 1 or a  
4 decreased level of said product of the gene of Figure 2 in said sample as compared to said  
5 gene product in said control sample indicates a predisposition to cancer.

1               10.    The method of claim 9, wherein the level of said gene product is  
2 measured in the biological sample and the control sample at the same time.

1               11.    The method of claim 1, wherein said animal is a mammal selected  
2 from the group consisting of humans, non-human primates, canines, felines, murines,  
3 bovines, equines, porcines, and lagomorphs.

1               12.    The method of claim 1, wherein said biological sample is selected  
2 from the group consisting of excised tissue, whole blood, serum, plasma, buccal scrape,  
3 saliva, cerebrospinal fluid, and urine.

1               13.    The method of claim 1, wherein the difference between said increased  
2 level of the gene of Figure 1 or said decreased level of the gene of Figure 2 in said biological  
3 sample and the level of said gene in said control sample is a statistically significant  
4 difference.

1               14.    The method of claim 1, wherein said increased level of the gene of  
2 Figure 1 or decreased level of the gene of Figure 2 in said biological sample is at least about  
3 2-fold greater or lesser than the level of said gene in said control sample.

1               15.    The method of claim 1, wherein said increased level of the gene of Figure 1 or  
2 decreased level of the gene of Figure 2 in said biological sample is at least about 4-fold  
3 greater or lesser than the level of said gene in said control sample.

5               16.    A method of estimating the survival expectancy of an animal, said method  
6 comprising:

7               (i) providing a biological sample from said animal;

8                         (ii) detecting the level of a gene of Figure 1 or Figure 2 within said biological  
9 sample; and  
10                         (iii) comparing said level of said gene with a level of said gene in a control sample  
11 taken from a normal, cancer-free tissue;  
12 wherein an increased level of the gene of Figure 1 or a decreased level of the gene of Figure  
13 2 in said biological sample compared to the level of said gene in said control sample  
14 indicates a reduced survival expectancy in said animal compared to an animal with cancer  
15 that has a normal level of said gene.

1                         17.       The method of claim 16, wherein said level of said gene is detected by  
2 determining the copy number of said genes in the cells of said animal.

1                         18.       The method of claim 17, wherein said copy number is determined by  
2 hybridization to an array of nucleic acid probes.

1                         19.       The method of claim 17, wherein said copy number is measured using  
2 Comparative Genomic Hybridization.

1                         20.       The method of claim 19, wherein said Comparative Genomic  
2 Hybridization is performed on an array.

1                         21.       The method of claim 16, wherein said level of said gene is detected by  
2 measuring the level of said gene mRNA in said biological sample, wherein an increased  
3 level of RNA of the gene of Figure 1 or decreased level of the RNA of the gene of Figure 2  
4 in said sample as compared to RNA in said control sample indicates a reduced survival  
5 expectancy.

1                         22.       The method of claim 1, wherein said level of mRNA is measured in  
2 said biological sample and said control sample at the same time.

1                         23.       The method of claim 16, wherein said level of said gene is detected by  
2 measuring the level of the gene product of said gene in said biological sample, wherein an  
3 increased level of the gene product of a gene of Figure 1 or decreased level of the gene  
4 product of a gene of Figure 2 in said sample as compared to said gene said control sample  
5 indicates a reduced survival expectancy.

1               24. The method of claim 16, wherein said animal is a mammal selected  
2 from the group consisting of humans, non-human primates, canines, felines, murines,  
3 bovines, equines, porcines, and lagomorphs.

1               25. The method of claim 16, wherein said biological sample is selected  
2 from the group consisting of excised tissue, whole blood, serum, plasma, buccal scrape,  
3 saliva, cerebrospinal fluid, and urine.

1               26. The method of claim 16, wherein the difference between said level of  
2 said gene in said biological sample and the level of said gene in said control sample is a  
3 statistically significant difference.

1               27. The method of claim 16, wherein said increased level of said gene of  
2 Figure 1 or said decreased level of said gene of Figure 2 in said biological sample is at least  
3 about 2-fold different than the level of said gene in said control sample.

1               28. The method of claim 16, wherein said increased level of said gene of  
2 Figure 1 or said decreased level of said gene of Figure 2 in said biological sample is at least  
3 about 4-fold different than the level of said gene in said control sample.

4 .

1               29. A method of treating cancer in an animal, said method comprising:  
2                     (i) providing a biological sample from said animal;  
3                     (ii) detecting the level of a gene of Figure 1 or Figure 2 within said  
4 biological sample;  
5                     (iii) comparing said level of said gene with a level of said gene in a  
6 control sample taken from a normal, cancer-free tissue; and  
7                     (iv) selecting and performing a cancer therapy in those animals having  
8 an increased level of said gene of Figure 1 or a decreased level of said gene of Figure 2  
9 compared to the level of said gene in said control sample.

1               11. The method of claim 29, wherein said cancer therapy is selected from  
2 the group consisting of chemotherapy, radiation therapy, surgery, antihormone therapy, and  
3 immunotherapy.

1               31. The method of claim 29, wherein said cancer therapy is an adjuvant  
2 cancer therapy.

1               32. The method of claim 29, wherein said level of said gene is detected by  
2 determining the copy number of genes in the cells of said animal.

1               33. The method of claim 32, wherein said copy number of genes is  
2 determined by hybridization to an array of nucleic acid probes.

1               34. The method of claim 32, wherein said copy number of said genes is  
2 measured using Comparative Genomic Hybridization (CGH).

1               35. The method of claim 34, wherein said Comparative Genomic  
2 Hybridization is performed on an array.

1               36. The method of claim 29, wherein said level of said gene is detected by  
2 measuring the levels of said gene mRNA in said biological sample, wherein an increased  
3 level of said gene of Figure 1 or a decreased level of said gene of Figure 2 RNA in said  
4 sample as compared to said gene RNA in said control sample indicates the need for an  
5 adjuvant cancer therapy.

1               37. The method of claim 36, wherein said level of said gene RNA is  
2 measured in said biological sample and said control sample at the same time.

1               38. The method of claim 29, wherein said level of said gene is detected by  
2 measuring the level of the product of said gene in said biological sample, wherein an  
3 increased level of the product of said gene of Figure 1 or a decreased level of the product of  
4 said gene of Figure 2 in said sample as compared to said gene product in said control sample  
5 indicates the need for an adjuvant cancer therapy.

1               39. The method of claim 29, wherein said animal is a mammal selected  
2 from the group consisting of humans, non-human primates, canines, felines, murines,  
3 bovines, equines, porcines, and lagomorphs.

1                  40.        The method of claim 29, wherein said biological sample is selected  
2 from the group consisting of excised tissue, whole blood, serum, plasma, cerebrospinal fluid,  
3 buccal scrape, saliva, and urine.

1                  41.        The method of claim 29, wherein the difference between said  
2 increased level of said gene in said biological sample and the level of said gene in said  
3 control sample is a statistically significant difference.

1                  42.        The method of claim 29, wherein said increased level of said gene in  
2 said biological sample is at least about 2-fold different than the level of said gene in said  
3 control sample.

1                  43.        The method of claim 29, wherein said level of said gene in said  
2 biological sample is at least about 4-fold different than the level of said gene in said control  
3 sample.

1                  44.        A method of screening a test agent for the ability to inhibit  
2 proliferation of a cell expressing a gene of Figure 1 or Figure 2, said method comprising:  
3                      (i) contacting said cell with said test agent; and  
4                      (ii) detecting the level of said gene activity;  
5 wherein a decreased level of activity of a gene of Figure 1 or an increased level of activity of  
6 a gene of Figure 2 as compared to the level of gene activity in a cell not contacted with said  
7 agent indicates that said agent inhibits proliferation of said cell.

1                  45.        The method of claim 44, wherein said detecting comprises detecting  
2 the level of a product of said gene wherein a decreased level of said product of said gene of  
3 Figure 1 or an increased level of said product of said gene of Figure 2 in said cell as  
4 compared to the gene product level in a cell not contacted with said agent sample indicates  
5 that said agent inhibits proliferation of said cell.

1                  46.        The method of claim 44, wherein said cell is a tumor cell.

1                  47.        The method of claim 44, wherein said cell is a hyperproliferative cell.

1                  48.     The method of claim 44, wherein the difference between said gene  
2 activity and the level of said gene activity activity in a cell not contacted with said agent is a  
3 statistically significant difference.

1                  49.     The method of claim 44, wherein said level of gene activity is at least  
2 about 2-fold different than the level of gene activity in a cell not contacted with said agent.

1                  50.     The method of claim 44, wherein said level of said gene activity is at  
2 least about 4-fold different than the level of said gene activity in a cell not contacted with  
3 said agent.

1                  51       A method of decreasing the proliferation of a cell with an elevated  
2 level of a gene of Figure 1, said method comprising reducing the level of said gene activity  
3 in said cell using an inhibitor of said gene.

1                  52.     The method of claim 51, wherein said cell is a hyperproliferative cell.

1                  53.     The method of claim 51, wherein said cell is a metastatic cell.

1                  54.     The method of claim 51, wherein said inhibitor is selected from the  
2 group consisting of antisense oligonucleotides, ribozymes, and repressors of said gene.